Listing of Claims:

Claims 1-6 (canceled)

Claim 7 (original) A method for measuring the dose of radiation accumulated in a stimulable phosphor as a radiation detecting medium having a fluorescence lifetime of no longer than 2 μs, comprising the steps of illuminating the stimulable phosphor with pulsed exciting light having an irradiation time not longer than the lifetime of stimulated fluorescence from the stimulable phosphor, detecting the emitted fluorescence with a photodetector, amplifying the detected signal with a charge-sensitive preamplifier, feeding the amplified output signal into a pulse shaping amplifier where it is subjected to both waveform shaping with a time constant longer than the lifetime of stimulated fluorescence from the stimulable phosphor and amplification, and feeding the shaped and amplified signal into an analog/digital converter to determine the pulse height.

Claim 8 (original) The method according to claim 7, wherein a gated photomultiplier tube is used as the photodetector and synchronously with the illumination of the stimulable phosphor with pulsed exciting light having an irradiation time not longer than the lifetime of stimulated fluorescence from the stimulable phosphor, the gate of the photomultiplier tube is controlled such that it remains off as long as the illumination continues but turns on after the illumination ends, and the emission of stimulated fluorescence from the excited stimulable phosphor is detected.

Claim 9 (currently amended) A method for measuring the dose of radiation accumulated in a stimulable phosphor as a radiation detecting medium having a fluorescence lifetime of no longer than 2 μs, comprising the steps of illuminating the stimulable phosphor with pulsed exciting light having an irradiation time not longer than twice the lifetime of stimulated fluorescence from the stimulable phosphor, detecting the emitted fluorescence with a photodetector, amplifying the detected signal with a signal amplifier, feeding the amplified output signal into a pulse height discriminator, picking up the signal for stimulated fluorescence as a pulse signal, performing coincident counting on the pulse signal and a read signal constructed using a signal indicating the time duration of illumination with the pulsed exciting light, whereby the stimulated fluorescence signal is picked up on the basis of it being output in accordance with the lifetime of fluorescence upon illumination with the pulsed exciting light, and counting the number of stimulated fluorescence signals with a counter circuit.

Claim 10 (original) A method of measuring radiation by illuminating a stimulate phosphor as a radiation detecting medium with exciting light to read the dose of radiation accumulated in the stimulate phosphor, wherein a laterally radiating optical fiber is used as a radiator of the exciting light.

Claim 11 (original) The method according to claim 10, wherein the radiator of exciting light is a semi-laterally radiating optical fiber that radiates light from a portion of its circumference.

Claim 12 (original) The method according to claim 11, wherein a light reflector is provided on the side of the semi-laterally radiating optical fiber which is remote from the light radiating part of the fiber or around its entire circumference except the light radiating part.

Claims 13-20 (canceled)

Claim 21 (currently amended)

~~The~~ A method for measuring radiation using an apparatus ~~according to claim 20,~~ for measuring radiation with a radiation detecting portion comprising in superposition at least one laterally radiating optical fiber, a stimulable phosphor as a radiation detecting medium, an optical bandpass filter centered at the wavelength of fluorescence, and at least one wavelength shifting optical fiber sensitive to the wavelength of stimulated fluorescence, wherein a streak camera is used as the photodetector of stimulated fluorescence output from the wavelength shifting optical fiber, the temporal distribution of the intensity of stimulated fluorescence is measured synchronously with the pulsed exciting light, and the positional distribution of the dose of radiation incident at the cite of measurement is determined from the relationship between the time of incidence of pulsed exciting light inputted from the light source into at least one laterally radiating optical fiber and the temporal distribution of the intensity of the stimulated fluorescence detected by the photodetector.

Claim 22 (currently amended)

The ~~apparatus according to any one of claims 18 -~~ method of claim 21, wherein the process comprising the steps of illuminating the stimulable phosphor with pulsed exciting light

having a time duration not longer than the lifetime of fluorescence from the stimulable phosphor via at least one laterally radiating optical fiber and detecting the emission of stimulated fluorescence from the stimulable phosphor via the wavelength shifting optical fiber is repeated more than once, the temporal distribution of the intensity of stimulated fluorescence is integrated and on the basis of the result of integration, the positional distribution of the dose of radiation incident at the site of measurement is determined from the relationship between the time of incidence of pulsed exciting light input from the light source into at least one laterally radiating optical fiber and the temporal distribution of the intensity of the stimulated fluorescence detected by the photodetector.

Claim 23 (currently amended)

An apparatus for measuring radiation ~~using~~ having a radiation detecting portion comprising in superposition at least two stimulable phosphors as a radiation detecting medium, an optical fiber for illuminating each stimulable phosphor with exciting light, an optical bandpass filter centered at the wavelength of the stimulated fluorescence emitted from the respective stimulable phosphors upon illumination with exciting light, and at least one wavelength shifting optical fiber that is sensitive to the wavelength of fluorescence from the respective bandpass filters and which is used to detect the emission of the stimulated fluorescence.

Claim 24 (original) In an apparatus for reading radiation image from a stimulable phosphor sheet which comprises a stimulable phosphor sheet, an exciting light source generating light of a wavelength that can excite the stimulable phosphor, a mechanism for illuminating the stimulable phosphor sheet with a rectangular pattern of the output exciting light, an optical

bandpass filter centered at the wavelength of stimulated fluorescence, a wavelength shifter bundle comprising a ribbon array of wavelength shifting optical fibers that can be excited with the stimulated fluorescence, an optical bandpass filter centered at the wavelength of the shifted fluorescence, a photodetector capable of multi-channel detection of the fluorescence emitted from the respective wavelength shifting optical fibers, and a signal processing unit that processes the signals from the multi-channel detector to produce digital signals for constructing a radiation image, the improvement wherein in order to illuminate the stimulable phosphor sheet with a rectangular pattern of the exciting light from the light source, laterally radiating optical fibers are arranged on the surface of the stimulable phosphor sheet in a direction perpendicular to the bundle of wavelength shifting optical fibers, the exciting light is launched from the light source into the laterally radiating optical fibers in turn, and the dose of radiation accumulated in the stimulable phosphor sheet is read together with the associated position information.

Claim 25 (currently amended)

An apparatus for performing the radiation measurement of ~~according to any one of claims~~ claim ~~13 - 17~~ 24, wherein the stimulated fluorescence that is output from both ends of the wavelength shifting optical fiber as wavelength shifted fluorescence is passed through an optical bandpass filter centered at the wavelength of said fluorescence and detected with the same photodetector.

Claim 26 (canceled)

Claim 27 (currently amended)

The method of any one of claims ~~3-6, and~~ 10 - 12, wherein ~~the~~ a dose of radiation accumulated in the stimulable phosphor is measured.

Claim 28 (currently amended)

~~An~~ The apparatus ~~for performing the radiation measurement according to any one of claims 1 - 27, which is capable of detecting neutrons using~~ of any one of claims 23-25 comprising a neutron detecting medium which is a stimulable phosphor that incorporates, mixes or combines with at least one neutron converter selected from among Gd, ^{6}Li and ^{10}B that is capable of converting neutrons to an ionizable radiation.

Claim 29 (original) The apparatus according to claim 28, wherein a neutron detecting portion using a radiation detecting medium capable of detecting neutrons is combined with a fast neutron moderator to enable detection of fast neutrons.

Claim 30 (currently amended)

An apparatus for performing the radiation measurement according to any one of claims ~~1 - 29~~23-25 or 29, wherein the temperature of the stimulable phosphor as a radiation detecting medium is measured with a temperature sensor and the dose of accumulated radiation that is measured by illumination with exciting light is corrected on the basis of the measured temperature.